Dwarfism and gigantism are common occurrences for island populations of vertebrates. Size affects many life history and fitness components and is subject to a large number of selective forces. The so-called island rule states that on an island small species will become large, and large species will become small. Many studies have aimed at determining the viability of this island rule is and different species and populations show mixed results in favor of and against the island rule.

We will look at several selective forces that incur the island rule and we will analyze why this is. Additionally we will look at several other selective forces that may counteract the island rule. In the end we would like to formulate a predictive model for body size change in insular vertebrates according to these selective forces.

Predator density and interspecific competition are generally lower on islands and these selective forces seem to confirm the island rule, by allowing character release on body size. However several other selective factors, are unaffected by character release or initial body size. For example, resource density is positively correlated with body size regardless of ancestral bodysize. Shifts in available diet may affect body size in both directions. Again this is not correlated with initial body size and can diverge from the island rule. Each of these selective forces may have a different effect in different species. Indeed selective forces acting on herbivores, may have no effect on predators. Even utilization of terrestrial versus aquatic prey may result in opposite bodysize effects.

The island rule certainly is not a law. The main problem is the large number of relevant selective forces acting on populations in nature. Some of these forces may be more important for certain species under certain conditions. However when looking at all selective forces separately in many cases a pattern exists. Unfortunately this may also reflect a bias for the island rule in the literature. Any populations’ body size may diverge either up or down, resulting in a 50/50 chance for each population to follow the island rule. Furthermore studies that find no effect are less likely to be published.

We conclude the island rule is not universally correct, but may have been acknowledged through biases that magnify the actual effect.

References


